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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte NICHOLAS THOMAS and PER ANDERSSON
Appellants

Appeal 2008-3116
Application 10/650,412
Patent Application Publication 2004/0058408
Technology Center 1700

Decided: July 23, 2008

Before RICHARD E. SCHAFER, SALLY GARDNER LANE, and JAMES T. MOORE *Administrative Patent Judges*.

LANE, *Administrative Patent Judge*.

DECISION ON APPEAL

I. STATEMENT OF THE CASE

The appeal is from a Final Rejection of claims 21-40, all of the pending claims. 35 U.S.C. § 134. We have jurisdiction under 35 U.S.C. § 6(b).

The application was filed August 28, 2003. The real party in interest is Gyros Patent AB. (App. Br. 3).

The Examiner relied on the following references:

Name	Number	Date
Mian	6,319,469	Nov. 20, 2001
Sheppard	6,143,247	Nov. 7, 2000
Chen	5,800,778	Sept. 1, 1998
Cathey	5,660,993	Aug. 26, 1997
Wolfe	5,190,879	Mar. 2, 1993
Cook	WO 94/26413	Nov. 24, 1994

Appellants did not argue against the prior art status of any of these references.

We note that Appellants did not file a Reply Brief.

Appellants appealed the rejection of claims 22-25 and 33-38 under 35 U.S.C. § 103(a) over the combination of the teachings of Sheppard, Mian, and Cathey. Appellants argued separately for the patentability of claims 22-24 and 33, for the patentability of claim 25, for the patentability of claims 34-35, and for the patentability of claims 36-38.

Appellants appealed the rejection of claims 21, 26, and 29-32 under 35 U.S.C. § 103(a) over the combination of the teachings of Sheppard, Mian, Cathey, and Chen.

Appellants appealed the rejection of claims 27 and 28 under 35 U.S.C. § 103(a) over the combination of the teachings of Sheppard, Mian, Cathey, Chen, and Wolfe.

Appellants appealed the rejection of claims 39 and 40 under 35 U.S.C. § 103(a) over the combination of the teachings of Sheppard, Mian, Cathey, and Cook.

We review a representative claim for each of the groups of claims rejected or argued separately by Appellants. *See* Bd. R. 41.37(c)(1)(vii).

II. FINDINGS OF FACT

The record supports the following findings of fact as well as any other findings of fact set forth in this opinion, by at least a preponderance of the evidence.

1. Claim 22 recites:

> An apparatus microfabricated for performing cell growth and/or cell based assays in a liquid medium, said apparatus comprising:
>
> a) a base plate supporting a plurality of micro-channel elements, each comprising a cell growth chamber, an inlet channel, and an outlet channel;
>
> b) a cover plate positioned over said base plate said cover plate extending over said elements so as to define said chambers and channels; and
>
> c) a hydrophobic valve in at least one of said chambers or said channels that is defined by positioning said cover plate over said base plate, wherein said valve comprises a localized region of hydrophobicity within said chamber or said channel.

(App. Br., Claims Appendix 16).

2. Figure 1a of Appellants' Specification is reproduced below:

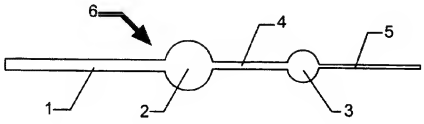

FIG. 1a

Figure 1a depicts the "plan of an individual micro-channel element . . ." (Spec. p. 4, ll. 12-13) with "a sample inlet channel (1) . . . a cell growth

chamber (2) for performing cell growth and connected through a channel (4) to an assay chamber (3) and an outlet channel (5) . . . ." (*Id.* 5, ll. 7-10).

3. Figure 1b of Appellants' specification is reproduced below:

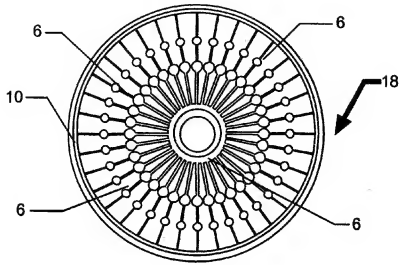

FIG. 1b

Figure 1b depicts a

> rotatable disc (18) microfabricated to provide a sample introduction port (not shown) located towards the centre of the disc and connected to an annular sample reservoir (9)[1] which in turn is connected to a plurality of radially dispersed micro-channel assay elements (6) each of said micro-channel elements comprising a cell growth chamber, a sample inlet channel and an outlet channel for removal of liquid therefrom and a cover plate positioned onto said disc so as to define closed chambers and connecting channels.

(Spec. 4, l. 26, through 5, l. 2).

[1] Our understanding of Figure 1b indicates that an error was made in labeling, wherein the element labeled "6" in the lower right quadrant is the "annular sample reservoir" and should have been labeled "9."

4. Mian describes the following are standard components:

> methods and apparatus for the manipulation of samples consisting of fluids, cells and/or particles (generically termed "sample" herein) containing an analyte of interest. The platforms of the invention consist of systems comprising sample input ports, microchannels for fluid flow, reagent reservoirs, mixing chambers, reaction chambers . . . sample outlet ports, product outlet ports, mixing means . . . and other components as described herein or known to the skilled artisan.

(Mian col. 6, l. 66, through col. 7, l. 13).

5. Figure 1A of Mian is reproduced below:

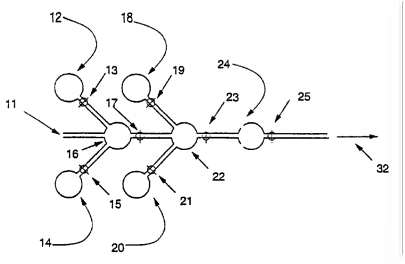

Figure 1A depicts a top view of the "microplatforms of the invention," including "reservoirs (12, 14, 18, 20), valves (13, 15, 17, 19, 21, 23, 25) reaction chambers (16, 22, 24), ports (11, 32) and air vents (29, 33, 34, 35) in disks comprising the microplatforms of the invention." (Mian col. 4, ll. 47-51).

6. Figure 1C of Mian is reproduced below:

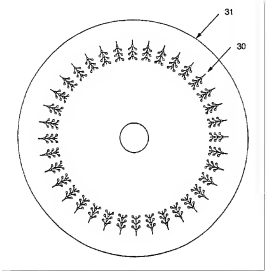

Figure 1C depicts "the arrangement of a multiplicity of microsystems on a disk." (Mian col. 4, ll. 51-52).

7. Mian Example 1, entitled "Fabrication of Microplatform Disks for Chemical Analysis, Synthesis, and Applications," (Mian col. 39, ll. 23-24), teaches that after liquid reagents are injected into the appropriate reservoirs, "a protective cover layer comprising a thin plastic film" is applied over the reservoirs of the microplatform disks. (Mian col. 40, ll. 3-5).

8. Mian teaches that the "[c]ontrol of fluid movement and transfer on the disk typically includes the use of valving mechanisms (microvalves) to permit or prevent fluid movement between components." (Mian col. 17, ll. 38-41).

9. Mian describes one of the valving mechanisms, wherein:

> Fluids which completely or partially wet the material of the microchannels (or reservoirs, reaction chambers, detection chambers, etc.) which contain them experience a resistance to flow when moving from a microchannel of narrow cross-

> section to one of larger cross-section, while those fluids which do not wet these materials resist flowing from microchannels (or reservoirs, reaction chambers, detection chambers, etc.) of large cross-section to those with smaller cross-section. This capillary pressure varies inversely with the sizes of the two microchannels (or reservoirs, reaction chambers, detection chambers, etc., or combinations thereof), the surface tension of the fluid, and the contact angle of the fluid on the material of the microchannels (or reservoirs, reaction chambers, detection chambers, etc.).

(Mian col. 19, ll. 31-44).

10. Mian does not specifically teach valves that use a "localized region of hydrophobicity" to work.

11. The disclosure of Sheppard

> provides an integrated, affinity-binding based analytical system for detecting particulates, particularly cells, suspended in a fluid, especially a biological fluid. In particular, the invention provides a platform for performing an affinity-binding based assay for specifically binding particulates including cells, and a detection means for detecting the particulates specifically bound to a defined surface or chamber comprising the platform.

(Sheppard col. 1, ll. 12-19).

12. Figure 2 of Sheppard is reproduced below:

FIG. 2

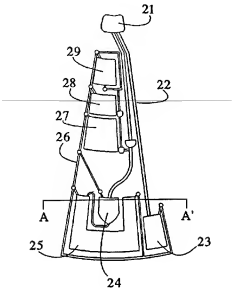

Figure 2 depicts

> an exemplar arrangement of platform components useful for enumerating particulates in a fluid, for example cell counting, and comprises a sample input port 21 connected to an overflow chamber 23 via a fluid capillary 22. The sample inlet port 21 is fluidly connected to the binding chamber 24, which is in turn connected to a waste chamber 25. Air displacement channels 26 facilitate filling of chambers. Wash buffer chambers 27 and 29, and a dye chamber 28 are fluidically connected to the binding chamber 24 via fluid capillaries 22.

(Sheppard col. 8, ll. 15-25).

13. Sheppard teaches that "[i]n another preferred embodiment, the platform is a rotatable structure, most preferably a disk. In a preferred embodiment of this aspect of the invention, the disk is a microplatform as disclosed in co-owned and co-pending Ser. No. 08/768,990, filed Dec. 18, 1996, incorporated by reference." (Sheppard col. 3, ll. 28-33).

14. Patent Application No. 08/786,990 issued as Mian, which was cited by the Examiner.

15. Sheppard teaches that "advantageously comprising certain embodiments of the inventive platform are valves for controlling fluid flow between components . . . ." (Sheppard col. 13, ll. 65-67).

16. Sheppard discloses:

> Valving mechanisms are provided to control of fluid movement and transfer on the platform. The nature of the valves useful in the platforms of the invention are essentially identical to the valves and microvalves disclosed in co-owned and co-pending U.S. Ser. No. 08/768,990, filed Dec. 18, 1996, explicitly incorporated by reference herein. These valve [sic] include mechanical, thermal and capillary valves.

(Sheppard col. 20, ll. 12-19).

17. Sheppard provides an example for "automated evaluation of the effect of test molecules on a population of cells." (Sheppard col. 34, ll. 66-67).

18. Figure 3H of Sheppard depicts an apparatus in which "the binding chamber 34 has been replaced by a number of chambers in which distinct specific binding reagents comprising first members of an affinity binding pair have been deposited." (Sheppard col. 8, ll. 50-53).

19. Sheppard does not specifically teach valves that use a "localized region of hydrophobicity" to work.

20. Cathey teaches disposable devices for analyte detection assays (Cathey col. 1, ll. 15-16) and addresses the problem of providing "improved control and reproducibility over reagent interaction and fluid flow through the device." (Cathey col. 2, ll. 10-13).

21. The devices taught in Cathey comprise "a sample addition port in fluid communication with at least one main channel. The main channel comprises, in the direction of fluid flow, a main reagent area in fluid communication with an incubation area and a waste area." (Cathey col. 2, ll. 54-58).

22. Cathey teaches:

> Control of fluid flow through the main and side reagent channels may be enhanced though use of a variety of means. For example, where one desires to enhance fluid flow through a device, one may provide for hydrophilic regions in the channel at the appropriate region, where the hydrophilic region serves to attract and draw fluid through that region. Alternatively, where one wishes to slow or impede fluid flow through a particular region of the channel, one may provide for hydrophobic areas in that particular region.

(Cathey col. 5, ll. 47-55).

23. Chen relates to "improved sealant for biocards and other sample holders used for analyzing biological samples . . . ." (Chen col. 1, ll. 5-7).

24. Figure 1 of Chen is reproduced below:

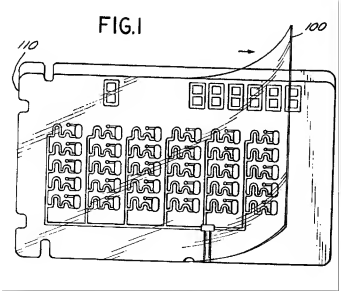

Figure 1 depicts an "improved sealant . . . in application to a biocard 110, generally in the form of adhesive-backed plastic film or membrane which can be rolled, measured, cut and otherwise easily handled when sealing reactants and samples into biocards or other sample holders." (Chen col. 2, ll. 22-27).

25. The improved sealant taught in Chen demonstrates "increased growth rates, in an enhanced oxygen environment" of microorganisms in a biological sample. (Chen col. 3, ll. 3-7).

26. Wolfe addresses the problem of biological contamination when shipping animal, plant, or microbial cells. (Wolfe abstract).

27. Wolfe teaches using membranes of polydimethylsiloxanes as "a barrier against microbial contaminants in the surrounding environment." (Wolfe col. 2, ll. 39-50).

28. There is no dispute that polydimethylsiloxane is a silicone polymer.

29. Cook addresses the problems of experimentation on the "responses and properties of cells in a dynamic context," without invading or disrupting the structural or functional integrity of the cells. (Cook 1, ll. 27-36).

30. Cook teaches a vessel with an interior surface having a "layer comprising a scintillant substance and being adapted for the attachment and/or growth of cells." (Cook 9, ll. 28-34).

31. Cook teaches:

> Virtually all types of biological molecules can be studied using this invention. That is, any molecule or complex of molecules that interact with the cell surface or that can be take up, transported and metabolised by the cell, can be examined using

> real time analysis. Examples of biomolecules will include, receptor ligands . . . .

(Cook 17, ll. 17-23).

III. LEGAL PRINCIPLES

To determine whether subject matter would have been obvious,

> the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved . . . . Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented.

Graham v. John Deere Co. of Kansas City, 383 U.S. 1, 17-18 (1966).

The Supreme Court has noted that a combination of references renders claimed subject matter obvious

> [w]hen a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, § 103 likely bars its patentability. For the same reason, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.

KSR Int'l Co. v. Teleflex Inc., 127 S.Ct. 1727, 1740 (2007). The Court acknowledged that a reason why the references would have been combined must be stated if the rejection involves the "interrelated teachings of multiple patents," *id.* However, the Court noted that "the analysis need not seek out precise teachings directed to the specific subject matter of the challenged

claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." *Id.* at 1741.

In general, "[f]or over half a century, the Court has held that a 'patent for a combination which only unites old elements with no change in their respective functions . . . obviously withdraws what is already known into the field of its monopoly and diminishes the resources available to skillful men.'" *Id.* at 1739.

IV. ANALYSIS

Claims 22-25 and 33-38 – Mian, Sheppard, and Cathey

Claim 22 recites:

> An apparatus microfabricated for performing cell growth and/or cell based assays in a liquid medium, said apparatus comprising:
>
> a) a base plate supporting a plurality of micro-channel elements, each comprising a cell growth chamber, an inlet channel, and an outlet channel;
>
> b) a cover plate positioned over said base plate said cover plate extending over said elements so as to define said chambers and channels; and
>
> c) a hydrophobic valve in at least one of said chambers or said channels that is defined by positioning said cover plate over said base plate, wherein said valve comprises a localized region of hydrophobicity within said chamber or said channel.

(FF[2] 1). An embodiment of the micro-channel element recited in claim 22 is depicted in Figure 1a of Appellants' specification (FF 2), and the arrangement of such micro-channel elements on a rotatable disc is depicted in Figure 1b (FF 3).

Mian relates to "methods and apparatus for the manipulation of samples consisting of fluids, cells and/or particles . . . ." (FF 4). Mian

[2] Finding of Fact.

provides "platforms" that "consist of systems comprising sample input ports, microchannels for fluid flow, reagent reservoirs, mixing chambers, reaction chambers . . . sample outlet ports, product outlet ports, mixing means . . . and other components . . . ." (FF 4). Figure 1A depicts the reservoirs, reaction chambers, and valves on "disks comprising the microplatforms of the invention." (FF 5). Figure 1C of Mian depicts the arrangement of a multiplicity of these "microsystems" on a disk platform or base. (FF 6). Mian teaches in Example 1 that "a protective cover layer comprising a thin plastic film" can be applied after liquid reagents are added to reservoirs of the microplatform disks. (FF 7).

In embodiments, the valves taught in Mian work on the principle that

> fluids which completely or partially wet the material of the microchannels (or reservoirs, reaction chambers, detection chambers, etc.) which contain them experience a resistance to flow when moving from a microchannel of narrow cross-section to one of larger cross-section, while those fluids which do not wet these materials resist flowing from microchannels (or reservoirs, reaction chambers, detection chambers, etc.) of large cross-section to those with smaller cross-section.

(FF 9). Thus, Mian teaches valves that incorporate hydrophobic surfaces and differential cross-section size to operate. Mian does not specifically provide for valves with a "localized region of hydrophobicity," as claimed. (FF 10).

Sheppard "provides a platform for performing an affinity-binding based assay for specifically binding particulates including cells . . . ." (FF 11). The "platform components" of Sheppard are depicted in Figure 2 and include ports and channels for delivering fluids and chambers for binding reactions and reagents. (FF 12). In a preferred embodiment, Sheppard

provides a rotatable disk, including a microplatform, as disclosed in Mian, which is incorporated by reference. (FF 13 and 14). Sheppard also discloses valves such as those described in Mian. (FF 15). This apparatus can be used for "automated evaluation of the effect of test molecules on a population of cells." (FF 17). Sheppard incorporates Mian by reference to describe these microplatforms. Thus, those of skill in the art would have had reason to look to Sheppard's teaching of using these apparatuses to perform assays on cells, as Appellants claim, with Mian's teachings. Sheppard does not teach valves with a "localized region of hydrophobicity," as claimed. (FF 19).

Cathey relates to devices for analyte detection assays and "improved control and reproducibility over reagent interaction and fluid flow through the device." (FF 20). The devices of Cathey include a port, a main channel, a main reagent area, an incubation area, and a waste area. (FF 21). Cathey also teaches the control of fluid flow in this devices of the invention by

> provid[ing] for hydrophilic regions in the channel at the appropriate region, where the hydrophilic region serves to attract and draw fluid through that region. Alternatively, where one wishes to slow or impede fluid flow through a particular region of the channel, one may provide for hydrophobic areas in that particular region.

(FF 22). Thus, Cathey teaches localized regions of hydrophobicity to serve as valves for the control of fluids.

Those of skill in the art would have had reason to combine Cathey's teaching about hydrophobic valves with the teachings of Mian and Sheppard because each reference teaches that fluid flow between the components of the assay plate can be controlled by the valves they disclose (*see* FFs 8, 15, and 22), and so are art-recognized alternatives. Thus, the combination of the

teachings of Mian, Sheppard, and Cathey presents a prima facie case for the obviousness of the subject matter claimed in representative claim 22. *See KSR*, 127 S.Ct. at 1740 ("if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.").

Appellants argued that "[t]he Patent Office has not identified or otherwise accounted for the presence of a cover plate or hydrophobic valve elements in either Sheppard or Mian." (App. Br. 6). Accordingly to Appellants, Figure 1B of Mian does not teach a cover plate. However, the Examiner cited Mian for teaching "a protective cover layer comprising a thin plastic film" can be applied over the reservoirs of the microplatform disks disclosed. (FF 7; *see* Ans. 4). Thus, this element is taught.

In regard to the claimed hydrophobic valve, Appellants argued that "[t]he capillary valves in Sheppard & Mian are structurally and mechanistically unrelated to the claimed hydrophobic valves" (App. Br. 8) and asserted that "[t]he Cathey disclosure uses only capillary valving in its embodiments and does not disclose hydrophobic valves in any figures or working examples." (App. Br. 8). "All the disclosures in a reference must be evaluated, including nonpreferred embodiments . . . and a reference is not limited to the disclosure of specific working examples," *In re Mills*, 470 F.2d 649, 651 (CCPA 1972). Cathey teaches hydrophobic valves in its specification, even if not in its figures or working examples. These valves enhance the control of fluid flow (*see* FF 22), like the valving mechanisms provide by Mian and Sheppard (*see* FFs 8 and 15), and so are an alternative. Thus, we are not convinced by Appellants' argument.

Appellants also asserted that "Cathy [sic] does not support the position that the art, recognized hydrophobic valves as equivalents to capillary valves." (App. Br. 11). According to Appellants, "it cannot be prima facie obvious to substitute structurally and mechanistically different means for valving without some evidence of successful reduction to practice of both means in a relevant context." (*Id.* at 11-12). We note, though, that "[e]xpress suggestion to substitute one equivalent component or process for another is not necessary to render such substitution obvious." *In re Fout*, 675 F.2d 297, 301 (CCPA 1982). Both the hydrophobic valves and capillary valves are structures known by the person having ordinary skill in the art to control the flow of fluids . Appellants have not directed us to evidence that one skilled in the art would not have considered hydrophic valves to be an alternative to capillary valves.

Appellants argued that Sheppard and Mian teach away from the hydrophobic valves of Cathey because "Sheppard & Mian clearly teach that cells and proteins non-specifically adsorb to hydrophobic surfaces. Modifying Sheppard to use hydrophobic valves would run contrary to the specific teachings of Sheppard & Mian in the context of devices intended for use with protein &/or cell containing samples." (App. Br. 12). We are not convinced that the disclosures of Sheppard and Mian amount to a teaching away.

> What a reference teaches a person of ordinary skill is not . . . limited to what a reference specifically 'talks about' or what is specifically 'mentioned' or 'written' in the reference. Under the proper legal standard, a reference will teach away when it suggests that the developments flowing from its disclosures are unlikely to produce the objective of the applicant's invention.

Syntex (U.S.A.) LLC v. Apotex, Inc., 407 F.3d 1371, 1380 (Fed. Cir. 2005). Instead of expressly stating that hydrophobic surfaces should not be used, Sheppard and Mian both teach valves that rely on materials, wherein the movement of "those fluids which do not wet these materials resist flowing from microchannels . . . ." (FFs 8 and 16). Because we understand these materials to be hydrophobic, we understand Mian and Sheppard to contemplate valves that include hydrophobic materials. Appellants have not provided any evidence the specific hydrophobic valves of the type taught by Cathey would be inoperable in the platforms of Mian and Sheppard. Thus, we do not agree that Mian and Sheppard teach away from the hydrophobic valves of Cathey.

In summary, Appellants have not convinced us that the Examiner erred in rejecting claim 22.

Claim 25

Claim 25 requires that the apparatus of claim 22 comprises "a rotatable disc which is microfabricated to provide a sample introduction port located towards the center of the disc and connected to an annular sample reservoir, and wherein said micro-channel elements are radially dispersed on said disc with their respective input channels connected to receive sample from said reservoir." (App. Br., Claims Appendix 17). Appellants argued that neither Sheppard nor Mian disclose or suggest an "annular sample chamber." (App. Br. 13). Sheppard, though, provides element 21 of Figure 2, which is a sample input port and is shaped, along with other "platform components" that would be arranged as a disk, to be a part of a ring around the center of the disk. (FF 12). Although element 21 is a discrete segment of such a ring, it would be within the skill of those in the art to make a

complete ring of such ports by uniting all of the segments around the ring to form a common chamber. "If a person of ordinary skill can implement a predictable variation, § 103 likely bars its patentability." *KSR*, 127 S.Ct. at 1740. Appellants have not provided any evidence that element 21 of Sheppard Figure 2 would not have been obvious for one of skill in the art to modified to be an annular sample chamber. Therefore, Appellants have not convinced us that the Examiner erred in rejecting claim 25.

Claims 34 and 35

Claim 34 requires that "the cross-sectional area of said inlet channel is greater than that of said outlet channel." (App. Br., Claims Appendix 18). Appellants asserted that "[t]he cited portion of Mian discloses capillary valves for stopping flow until a threshold driving force is applied to the fluid. The passage has nothing to do with the limitations in claims 34-35 structurally or functionally." (App. Br. 13). As cited by the Examiner, Mian teaches that fluids can "experience a resistance to flow when moving from a microchannel of narrow cross-section to one of larger cross-section . . . ." (FF 9). Thus, Main teaches that the cross-section of channels can vary and those of skill in the art would be able to modify this teaching to make inlet chambers having a greater cross-sectional area than outlet chambers to control fluid flow. (FF 8) Appellants have not convinced us that the Examiner erred in rejecting claim 34.

Claims 36-38

Claim 36 requires that "at least some of said micro-channel elements each comprises one or more assay chambers for performing assays involving cellular constituents and connected in line between said cell growth chamber and said outlet channel." (App. Br., Claims Appendix 18). Appellants

asserted that the Examiner's rejection included "a) an admission that the art does not contain the elements and 2) a conclusory assertion that the limitations would be obvious in light of the totality of Mian & Sheppard." (App. Br. 14). Appellants did not specifically identify the "admission." The Examiner cited to Sheppard Figures 3 and 4, which depict different arrangements of platform components connected serially. For example, Figure 3H depicts that "the binding chamber 34 has been replaced by a number of chambers in which distinct specific binding reagents comprising first members of an affinity binding pair have been deposited." (FF 18). Appellants have not explained how the depictions in Sheppard Figure 3 do not meet the limitations of claim 36. Appellants have not shown that the Examiner erred in his rejection.

Claims 21, 26, and 29-32 – Mian, Sheppard, Cathey, and Chen

Claim 26 cites the apparatus of claim 22 and requires that the "cover plate is fabricated from a gas permeable plastic material." (App. Br., Claims Appendix 17). Chen relates to sealants for "biocards and other sample holders used for analyzing biological samples." (FF 23). Chen teaches sealing films for such assay platforms that allow "increased growth rates, in an enhanced oxygen environment," for microorganisms in a biological sample. (FFs 24-25). Appellants raised no arguments against the rejection of claim 26 beyond those raised against the rejection of claim 22. Accordingly, Appellants did not show that the Examiner erred in rejecting claim 26.

Claims 27 and 28 – Mian, Sheppard, Cathey, Chen, and Wolfe

Claim 27 recites the apparatus of claim 26 and requires that "plastic material is a silicone polymer, polyurethane or polytertrafluroethylene."

(App. Br., Claims Appendix 17). Wolfe addresses the problem of biological contamination (FF 26) and teaches polydimethylsiloxane, a silicone polymer (FF 28), as "a barrier against microbial contaminants. . . ." (FF 27). Appellants raised no arguments against the rejection of claim 27 beyond those raised against claim 22. Accordingly, Appellants have not shown that the Examiner erred in rejecting claim 27.

Claims 39 and 40 – Mian, Sheppard, Cathey, and Cook

Claim 39 depends on claims 36 and 37and recites an apparatus "wherein there is provided in or on an interior surface of one or more of said chambers a layer comprising a scintillant substance." (App. Br., Claims Appendix 19). Appellant did not raise any separate arguments against the rejection of claim 39 over claims 36 or 37. Cook addresses the problems of experimentation on the "responses and properties of cells in a dynamic context," without invading or disrupting the structural or functional integrity of the cells (FF 29) and, thus, relates to biological assays. Cook discloses that vessels with interior surfaces can have a "layer comprising a scintillant substance and . . . adapted for attachment and/or growth of cells." (FF 30).

Appellants argued separately against the rejection of claim 40, which recites additionally that "the layer comprising a scintillant substance comprises a binding moiety bound thereto, said binding moiety being a member of a specified binding pair selected from the group consisting of biotin, strepavidin, protein A, antibodies, lectins, hormone-receptors, nucleic acid probes, and DNA-binding proteins." (App. Br., Claims Appendix 19). According to Appellants, "[t]he cited portion of Cook is clearly and solely directed to analysis of molecules, viruses, ligands, etc. that interact with cells. Pg. 17, lines 17-33. This passage has nothing to do with the

additional limitation in claim 40 directed to platform attached, non-cellular binding moieties." In contrast, Cook discloses

> [v]irtually all types of biological molecules can be studied using this invention. That is, any molecule or complex of molecules that interact with the cell surface or that can be take up, transported and metabolised by the cell, can be examined using real time analysis. Examples of biomolecules will include, receptor ligands . . . .

(FF 31). Thus, those of skill in the art would appreciate that Cook teaches a wide variety of biological molecules such as receptor ligands and other non-cellular binding moieties. Appellants have not explained why the molecules taught in Cook differ structurally or functionally from those recited in claim 40 and would not render them obvious. Accordingly, Appellants have not convinced us that the Examiner erred in rejecting claims 39 and 40 under 35 U.S.C. § 103.

V. ORDER

Upon consideration of the record and for the reasons given,

the Examiner's rejection of claims 22-25 and 33-38 under 35 U.S.C. § 103(a) over the combination of the teachings of Sheppard, Mian, and Cathey is AFFIRMED;

the Examiner's rejection of claims 21, 26, and 29-32 under 35 U.S.C. § 103(a) over the combination of the teachings of Sheppard, Mian, Cathey, and Chen is AFFIRMED;

the Examiner's rejection of claims 27 and 28 under 35 U.S.C. § 103(a) over the combination of the teachings of Sheppard, Mian, Cathey, Chen, and Wolfe is AFFIRMED; and

the Examiner's rejection of claims 39 and 40 under 35 U.S.C. § 103(a) over the combination of the teachings of Sheppard, Mian, Cathey, and Cook is AFFIRMED.

Further Ordered no time period for taking any subsequent action in connection with this Appeal may be extended under 37 C.F.R. §1.136(a)(2006).

AFFIRMED

rvb

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